

What is claimed is:

1. A kind of automobile safety defense and alarm system including an alarm and monitor sensor, a communication module, a pickup, a CPU module, and mono/multi camera device/devices and/or numerical code camera device/devices having such characteristics that this system includes a face identification system consisting of
5 mono/multi camera device/devices, CPU module, a facial characteristics identification system program and a biological identification databank for identification.
2. A kind of safety defense and alarm system including an alarm and monitor sensor, a communication module, a pickup, a CPU module, and mono/multi camera device/devices
10 and/or numerical code camera device/devices having such characteristics that this system includes a face identification system consisting of camera device/devices, CPU module, a facial characteristics identification system program and a biological identification databank for identification.
3. A multi-functional head up display system that consists of a head up display and
15 camera devices having such characteristics that those camera devices are mounted inside or outside the vehicle and take pictures from different directions, and the head up display can display selected images token by visible light, low-light and/or infrared, thermo-luminous infrared camera devices and/or numerical code camera devices, acting as a noctovisor, side-looking/ back-looking mirror.
- 20 4. The combination defined in claim 1 or claim 2 wherein said automobile safety defense and alarm system includes redundant devices and/or redundant functional modules, automobile redundant monitor system program, and/or anti-destroying detecting system and/or anti-interference communication system, and/or anti-interference radio communication alarm system.
- 25 5. The combination defined in claim 1 or claim 2 wherein said automobile safety defense and alarm system includes visible light and low-light camera devices and/or numerical code camera devices and/or infrared camera devices and/or numerical code

camera devices, and/or thermo-luminous infrared camera devices and/or numerical code camera devices.

6. The combination defined in claim 1 wherein said automobile safety defense and alarm system includes a face identification system that consists of visible light, low-light camera devices and/or numerical code camera devices and/or infrared camera devices and/or numerical code camera devices, thermo-luminous infrared camera devices and/or numerical code camera devices and/or thermo-luminous electric infrared camera devices and/or numerical code camera devices and a software system including "Face characteristics and/or biological characteristics identification system program" and/or "Facemask identification system subprogram", and/or "Facial ornaments identification system subprogram", and/or "Face tilt identification system subprogram", and/or "Facial unusual expression identification system subprogram".

7. The combination defined in claim 1 or claim 2 wherein said automobile safety defense and alarm system includes a forward looking/side-looking/ back-looking head up display system that consists of visible light and low-light and/or infrared and/or thermo-luminous infrared camera devices and/or numerical code camera devices mounted inside or outside the vehicle and taken pictures from different directions, and the head up display.

8. The combination defined in claim 1 or claim 2 wherein said automobile safety defense and alarm system includes a face identification system software that consists of some sub-system programs such as "Face characteristics and/or biological characteristics identification system program" and/or "Facemask identification system subprogram", and/or "Facial ornaments identification system subprogram", and/or "Face tilt identification system subprogram".

9. The combination defined in claim 1 or claim 2 wherein said automobile safety defense and alarm system includes visible light, low-light and/or infrared, thermo-luminous infrared camera devices and/or numerical code camera devices with

orientations of the front, both sides and back directions set up inside and outside the vehicle.

10. The combination defined in claim 1 or claim 2 wherein said automobile safety defense and alarm system includes the monitor sensors and/or camera devices and/or numerical code camera devices set up under the chassis.

11. The combination defined in claim 1 or claim 2 wherein said automobile safety defense and alarm system includes a flash memory 2 (FLASH ROM) 123b storing each kind of data for operating system start disc, memory operating system, as well as each kind of control system program and application system program.

12. The combination defined in claim 1 or claim 2 wherein said automobile safety defense and alarm system includes an automobile status recorder for burst events (Black Box for Automobile Use) that can cyclically register and record the images and data information inside and outside the automobile picked up by the camera device before, when and after the burst event is/has happened. Those stored data will be read out for analysis after the burst event was occurred or transmitted to a control center by the radio communication system for filing or making other processing when the burst event is being occurred.

13. The combination defined in claim 1 or claim 2 wherein said automobile safety defense and alarm system includes an automobile anti-robbing system program.

14. The combination defined in claim 1 or claim 2 wherein said automobile safety defense and alarm system includes biological identification system and/or iris identification system, and/or retina identification system, and/or fingerprint identification system, and/or voice recognition system.

15. The combination defined in claim 1 or claim 2 wherein said automobile safety defense and alarm system includes an automobile status recorder for burst events (Black Box for Automobile Use) that can register and record the images and data information inside and outside the automobile picked up by the camera device before, when and after

the burst event is/has happened. Those stored data will be read out for analysis after the burst event was occurred or transmitted to a control center by the radio communication system for filing or making other processing before, when and after the burst event is/ is being/has occurred.

- 5 16. An redundant monitor system program that includes the following procedures: Using an alarm and monitor sensor, a communication module, a pickup, a CPU module, and mono/multi camera device/devices and/or numerical code camera device/devices in claim 1 to run the redundant monitor system program in every stipulated time; firstly, test the performance of each functional device and each functional module; If it is found out that a
10 functional device and a functional module is damaged, separate it and start preset replaced device/module instead of it and at the same time, start the alarm system program to take picture, make face identification and send alarm signal.

automobile anti-interference communication monitoring system.

- 15 17. A processing method of a kind of automobile anti-interference communication system includes the following steps: Using an alarm and monitor sensor, a radio communication module, a pickup, a CPU module, and the CPU module of the automobile alarm in claim 1 to start the anti-interference communication monitor system program and find out telecommunication interfered seriously; Start the anti-interference communication system to make anti-interference communication with the remote control center
20 successfully; Start the alarm program and/or immediately start alarm and vehicle-locking system program; When the remote control center finds out it is a man-made interference, immediately start alarm and vehicle-locking system program to find out its source, and inform the monitor workers that the communication has been disturbed seriously and should take steps to find out the vehicle.

- 25 18. A kind of anti-robbing alarm processing method includes the following steps: Using an alarm and monitor sensor, a radio communication module, a pickup, a CPU module, and mono/multi camera device/devices and/or numerical code camera device/devices to

start the alarm program at regular time when and after the vehicle is under the condition of monitoring; Running a program for verifying from where the person attempts to enter the vehicle; Starting the camera devices image-taking and image transmitting program to send the images to CPU module if a criminal suspect, or a robber, or an animal or an intruder without destructiveness attempts to enter or destroy the vehicle or is within the field of monitoring; Using the face identification system program and the specially designated persons' face characteristics databank to verify whether or not the driver is a legal one; If the person is found as illegal driver, start the alarm and communication system program to collect the data on face image of the person who has entered the vehicle and/or the images and information in the vehicle captured by the camera devices, after packing or non-packing the image data according to each packing protocol for the image transmission, and then transmitting those image and voice data or packed image and voice data and other automobile status information and preset each kind of information to a preset remote or near monitor and control center for alarming; Starting the burglar and anti-robbing control system program and implementing the commands sent from the vehicle and/or preset burglar and anti-robbing measures to carry out vehicle burglar and anti-robbing control; At the same time, a sound, optical or electrical alarm will be made, for example, flash lamp and alarm whistle and in addition, a face identification system program and a special persons' face character databank will be run; Starting the alarm system program when somebody attempts to enter into or has entered into the vehicle and found out as an illegal person or an animal so on.

19. A kind of anti-robbing alarm processing method for automobiles or other purpose includes the following steps: Using an alarm and monitor sensor, a radio communication module, a pickup, a CPU module, and mono/multi camera device/devices and/or numerical code camera device/devices in claim 1 to start the alarm program at regular time when or after starting a vehicle; Running the program to verify from where the person attempts to enter the vehicle; Starting the camera devices image-taking and

image transmitting program to send the images to CPU module; Using the face identification system program and the specially designated persons' face characteristics databank to verify whether or not the person who wants to enter or destroy the vehicle is a legal driver. If the person is found as illegal driver, start the alarm and communication system program to collect the data on face image of the person who has entered the vehicle and/or the images and information in the vehicle captured by the camera devices, after packing or non-packing the image data according to each packing protocol for the image transmission, and then transmitting those image and voice data or packed image and voice data and other automobile status information and preset each kind of information to a preset remote monitor and control center for alarming; Starting the burglar and anti-robbing control system program and implementing the commands from the vehicle and/or preset burglar and anti-robbing measures to carry out vehicle burglar and anti-robbing control.

20. An anti-interference communication system monitoring and processing method includes the following steps: Using an alarm and monitor sensor, a radio communication module, a pickup, a CPU module, and the CPU module of the automobile alarm in claim 1 to start the anti-interference communication monitor system program and find out telecommunication interfered seriously; Start the anti-interference communication system to make anti-interference communication with the remote control center successfully; Start the alarm program and/or immediately start alarm and vehicle-locking system program; When the remote control center finds out it is a man-made interference, immediately start alarm and vehicle-locking system program to find out its source, and inform the monitor workers that the communication has been disturbed seriously and should take steps to find out the vehicle.

21. The principle and processing method of a kind of automobile anti-interference communication monitor system includes the following steps: Using radio communication module, pickup and CPU module and the CPU for vehicle alarm start the automobile

anti-interference communication detection system program to check the communication information for interference; In the case that the communication is disturbed, stating the automobile anti-interference communication system program to make communication without interference with the remote monitor and control center; After that, starting the alarm system program to send alarm signal and/or starting the alarm and vehicle-locking program to lock the vehicle, stop the generator, make acoustic-optic alarm, capture and store the image data of the criminal suspect and so on. If the remote monitor and control center finds out the communication is disturbed seriously, immediately start the alarm system program and find out the interference source and confirm whether it is a man-made interference, otherwise, inform the monitor workers that the communication has been disturbed seriously and take steps to find out the vehicle.

22. A kind of automobile monitoring and processing method of face identification for the person with facemask or ornaments by means of camera devices includes the following treatment steps:

(1) Visible light, low-light and/or infrared, thermo-luminous infrared camera devices and photograph devices and/or numerical code camera devices.

(2) A monitor processing method to verify whether or not the driver wears face masks or face ornaments. That monitor method includes "Facemask identification system program", and/or "Facial characteristics and/or biological characteristics identification system program" and/or "Facial ornaments identification system program" and/or "Facial unusual expression identification system program".

(3) In order to increase the identification precision, a "Face tilt identification subprogram" is added.

The principle and processing method of "Facemask identification subprogram" :

1) There are 3 kinds of method to confirm whether or not the driver and other peoples have face masks:

(D) The person wears a facemask that can transmit the visible light and infrared or the

person doesn't wear facemask. In that case, visible light, low-light camera devices and infrared, thermo-luminous infrared camera devices (and thermo-luminous infrared sensing and monitoring devices) can take same real face images of that person.

(E) The person wears a facemask that can transmit infrared but the visible light.

5 Therefore, the visible light camera devices may take only the images of the facemask, and the infrared, thermo-luminous infrared camera devices (and thermo-luminous infrared sensing and monitoring devices) can take the real face images of that person. The face characteristics taken by three kinds of camera devices are not the same. It is possible to identify the change of facial expression through "Face tilt identification system program", give a prompt to the
10 person to be identified who should make a special expression, and then watch the change of facial expression of the person.

(F) The person wears a facemask that can't transmit both of visible light and infrared.

Therefore, visible light, low-light camera devices and infrared, thermo-luminous infrared camera devices (and thermo-luminous infrared sensing and monitoring devices) may take
15 only the images of the facemask but the person, because the infrared brightened from an object itself can not go out through the facemask. Even though a partial heat quantity can conduct on the surface of the facemask, but the heat distribution map is changed, not a normal heat distribution map of a human face. Therefore, the camera cannot take the infrared brightened from an object itself. The face characteristics taken by three kinds of camera
20 devices are not the same. According to the design requirements, that program can use only the visible light and infrared camera devices but thermo-luminous infrared camera devices.

At that time, run the "Face characteristics identification and comparison system program" and "Facemask identification and monitoring system program" to differentiate whether or not the person wears a facemask and which kind it is.

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2) The basic principle of "Facial ornaments identification system subprogram" is: With the facial ornaments, glasses, breathing mask, or scarf and so on, the above-mentioned three

photographing situation may be happened. At that time, the “Facial ornaments identification system subprogram” should be run to confirm whether or not the driver wears facial ornaments and provide a prompt to the driver, asking him/her to remove out his/her ornaments, retake his/her face image for re-carrying out the “Facial ornaments identification system subprogram”. In the case after the voice prompt is provided, the criminal suspect escapes from the scene of crime, it is unable to take his/her images. At that time, we can wait a moment, then run a preset treatment measures, for example, sending out his/her images taken before or reporting to the police and so on.

23. A kind of automobile monitoring and processing method of face identification for the person with facemask or ornaments includes: camera devices (including visible light, low-light and/or infrared, thermo-luminous infrared camera devices and/or numerical code camera devices,) and/or sound-receiving module will process the image signals and/or voice signals taken by visible light, low-light and/or infrared camera lens and sensitive elements individually and make a signal processing to those video frequency and audio frequency output signals. After signal processing, the processed signals will be as output analog or digital signals and through an output interface output to the CPU module and then CPU will run a monitoring processing program to confirm whether or not the driver wears facial ornaments by means of the image identification system program. The processing procedures of “Facial ornaments identification system subprogram” include: the following processing processes: camera device (and/or digital camera devices) and/or sound-receiving module will process the image signals and/or voice signals taken by camera lens and sensitive elements individually and make a signal processing to the video frequency and audio frequency output signals. After signal processing, the processed signals will be as output analog or digital signals and through an output interface output to the CPU module and then CPU will run a monitoring processing program to confirm whether or not the driver wears facial ornaments by means of the image identification system program.

During a vehicle is running, the driver may be in a situation among the following

situations:

- a. The driver doesn't wear facemask, facial ornaments;
- b. The driver wears facial ornaments, such as glasses, breathing mask, or scarf and so on;
- c. The driver doesn't wear facemask that can transmit infrared;
- 5 d. The driver doesn't wear facemask that can transmit partial infrared;
- e. The driver doesn't wear facemask that can't transmit infrared;

For the treatment procedures please refer to the flow chart Figure 16. The overall processing procedure is:

- 10 First of all, acquire the visible light and/or infrared images taken by the visible light, low-light and/or infrared camera devices and the thermo-luminous infrared images taken by the thermo-luminous infrared camera devices individually and then make a face identification processing to the face images data in those two kinds of image data individually, and finally compare those two kinds of image data in the face characteristics each other and differentiate
- 15 among them each other. As shown in figure 16, steps 1 – 3 adjust whether or not the driver wears facemask, and step 4 adjusts whether or not the driver wears face ornaments.

- Step1: (a) With the visible light and/or infrared images taken by the visible light, low-light and/or infrared camera devices and the thermo-luminous infrared images taken by
- 20 the thermo-luminous infrared camera devices, through a face identification processing to the face images data in those two kinds of image data made by the face characteristics identification system program individually, confirm that those images are the ones of the same person. In addition, the thermo-luminous infrared camera devices and/or the thermo-luminous electrical infrared sensing monitors sense normal infrared radiation from the face skin, which
- 25 indicates the situation of (a) or (b).

(b) In the situation (a), compare with the face image characteristics of legal driver in the biological identification characteristics databank. If the person in the vehicle is a legal

driver, enter into the sequential program. If the person in the vehicle is an illegal driver, then run “Facial ornaments identification system subprogram”, “Face tilt identification system subprogram”, and “Facial unusual expression identification system subprogram”. If the person is still an illegal driver, then make a alarming.

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Step 2. (a) With the visible light and/or infrared images taken by the visible light, low-light and/or infrared camera devices and the thermo-luminous infrared images taken by the thermo-luminous infrared camera devices, through a face identification processing to the face images data in those two kinds of image data made by the face characteristics
10 identification system program individually, confirm that those images are not the ones of the same person. In addition, the thermo-luminous infrared camera devices and/or the thermo-luminous electrical infrared sensing monitors sense normal infrared radiation from the face skin, which indicates the situation of (b) or (c). In the case of situation (c), It is possible to measure the temperature of face skin through the infrared intensity, which can measure the
15 infrared penetrability to the facemask. Run the “Facemask identification and monitoring system program” to inspect whether or not the driver wears facemask. If the person wears the facemask, then send an alarm.

(b) In the situation (c), firstly, compare with the face image characteristics of legal driver in the biological identification characteristics databank. If the person in the vehicle is an
20 illegal driver, then run “Facial ornaments identification system subprogram”, “Face tilt identification system subprogram”, and “Facial unusual expression identification system subprogram” to correct those mistakes. If the person is still an illegal driver, then make a alarming.

Step 3. On the one hand, the visible light and/or infrared images taken by the visible light,
25 low-light and/or infrared camera devices indicate that those images are the ones of the same person, and on the other hand, the thermo-luminous infrared camera devices and/or the thermo-luminous electrical infrared sensing monitors are unable to sense normal infrared

radiation from the face skin or are able to measure very weak infrared radiation from the face skin, which indicates the situation of (d) or (e); then send an alarm or run “Facial ornaments identification system subprogram”, “Face tilt identification system subprogram”, and “Facial unusual expression identification system subprogram” to correct those mistakes. If the person
5 is still an illegal driver, then make a alarming.

Step 4. (a) With the visible light and/or infrared images taken by the visible light, low-light and/or infrared camera devices and the thermo-luminous infrared images taken by the thermo-luminous infrared camera devices, through a face identification processing to the
10 face images data in those two kinds of image data made by the face characteristics identification system program individually, confirm that those images are the ones of the same person. In addition, the thermo-luminous infrared camera devices and/or the thermo-luminous electrical infrared sensing monitors can sense normal infrared radiation from the face skin, which indicates the situation of (a). When comparing with the face image characteristics of
15 legal driver in the biological identification characteristics databank, if it is impossible to confirm whether or not the person in the vehicle is an legal driver (or the system program of comparing with the face image characteristics of legal driver in the biological identification characteristics databank is not carried out), then run “Facial ornaments identification system subprogram”, “Face tilt identification system subprogram”, and “Facial unusual expression
20 identification system subprogram”. If the person is found out that he/she wears facial ornaments or his/her face isn’t directed at the camera, then provide a prompt to the driver, asking him/her to remove out his/her ornaments, or correct his/her facial unusual expression or his/her face being directed at the camera, retake his/her face image for re-carrying out face identification and remaking a comparison. If the driver is found out as a legal one, then ask
25 the diver to wear his/her ornaments on, retake his/her face image data and store them (or the face characteristics data of the driver with the facemask, facial ornaments or tiled face taken before) in the biological characteristics databank of legal drivers as that driver’s new face

characteristics data. If the driver is found out as an illegal driver, make an alarm processing.

24. A kind of chassis anti-destroying and monitoring system by means of camera devices includes the following treatment steps: Mono/multi camera device are set under the chassis. In general, the lens covers cover them, only after the burglar and anti-robbing alarm system is started or after the alarm sensor under the chassis is triggered, the covers are then opened to start devices for taking pictures when a burst event has been occurred. At the same time, run a dynamic monitoring program for chassis and the anti-destroying and monitoring system program for alarming.

25. Processing principle and method of an automobile burst event monitor and alarm system includes the following processing procedures: (1) Starting; (2) Read out the information data from each alarm sensor; (3) Compare and find out any unusual data; (4) Recheck each item of information data. Some data may be changed greatly if a burst event is occurred. (5) Find out the position of the sensor that outputs unusual data; (6) Inspect the damages in the vehicle; (7) Interrupt storing the data in the "Before occurrence of a burst event automobile status recorder" (Auto Black Box), and keep data record integrity; (8) Start storing and recording the data in the "When and after occurrence of a burst event automobile status recorder" (Auto Black Box), and keep data record integrity; (9) According to a preset requirement, output the data stored in the automobile status recorder (Auto Black Box) acquired before, when and after a burst event is/has been occurred through radio communication method; (10) Finished? (11) End.

26. An anti-interference radio communication alarming system includes a radio communication system, an anti-interference radio communication monitoring system and an anti-interference radio communication alarming system for vehicle stopping and running. Its principle and processing method is: When a vehicle is in the stopping and alarming status, in the case the criminal suspect uses a radio communication interference device to interfere the radio communication, at that time, start the anti-interference radio communication alarming system program, which includes the following processing procedures:

(1) Starting; (2) Inspect whether the vehicle is in the stopping and alarming status; (3) Read out and identify the numerical secret codes for entering the Network, such as ID number, shake hand signal data and so on; (4) Test the read-out data; (5) Re-test the read-out communication data if some unusual data are found out; (6) Re-read and identify the numerical secret codes for entering the Network; (7) If that item of data is unusual, enter into alarming status; (8) Start the vehicle locking alarm status and start radio communication interference signal identification system to adjust whether it is a man-made interference. If it is a man-made interference, find out its frequency, signal wave, direction and strength; (9) Start the anti-interference radio communication system to make anti-interference radio communication, for example, changing communication frequency, starting other radio communication system such as USA Pacific Crest Corporation's high-rate data transmission radio station EDL, satellite communication system or other communication method mentioned above; (10) Carry out alarm communication; (11) End.

27. An anti-interference radio communication alarming system used while a vehicle is running, in the case the criminal suspect uses a radio communication interference device to interfere the radio communication, at that time, start the anti-interference radio communication alarming system program, which includes the following processing procedures:

(1) Starting; (2) Read out and identify the numerical secret codes for entering the Network, such as ID number, shake hand signal and so on; (3) Test the read-out data; (4) Re-test the read-out communication data if some unusual data are found out; If they are unusual data, then test the data read out before; (5) Is the radio signal is weakening gradually or is the background noise increased greatly? (6) If it is found out that the radio signal is not weakened gradually or the background noise is increased greatly, then we can consider it is a man-made interference, start the radio communication interference identification system; (7) After confirming it is a man-made interference, then enter into alarming status, and start the anti-interference radio communication system, and find out its frequency, signal wave,

direction and strength; (8) Start the anti-interference radio communication system to make an anti-interference radio communication, for example, changing communication frequency, starting other radio communication system such as USA Pacific Crest Corporation's high-rate data transmission radio station EDL, satellite communication system or other communication method mentioned above; or wait till the communication signal is normal; (9) Transmit alarming information; (10) Start the vehicle locking burglar alarm system.

According to the design requirements, select overall or several processing steps and equip with the equipment corresponding to them.

28. A kind of face tilt identification system includes the following processing procedures:

(a) Starting ; (b) The camera devices capture the images of the face; (c) Search after face images; (d) Make the face identification; (e) Select position of the reference object, such as nasal apex, or other facial organs. (f) Calculating the distance from other reference objects such as eye, mouth, ear, edge of the face etc, and the proportion with above, lower, right and left edges; (g) Adjust whether or not the face is tilting; (h) If the face is tilting, provide a prompt for correcting; (j) If the face is not tilting, then end the program.

29. A kind of Face ornaments identification system program includes the following processing procedures:

(a) Starting ; (b) The camera devices capture the images of the face; (c) Search after face images; (d) Search for face ornaments or directly carry out the "Face ornaments identification system program"; (e) Carry out the "Face ornaments identification system program"; (f) Compare between the captured images and each biological image of the face with facial ornaments stored in the biological characteristics databank of legal drivers, and confirm which kind of face ornaments it is; (g) Adjust whether or not the face ornament has influence on face identification; (h) If it has influence on face identification, provide a prompt to remove out it from the face; (i) If it has no influence on face identification, then end the program.

30. A kind of human face characters and/or animal characters identification and judgment

includes the following processing procedures:

(a) Starting ; (b) The camera devices capture the images of the animal; (c) Search after human face and/or animal images; (d) Identify human face and/or animal characters; (e) Compare between the identification results and the characters of each kind of animal stored in the biological characteristics databank; (f) Identify which person or which kind of animal it is; (g) Adjust whether or not the person and/or that animal has a harmfulness; (h) If it has no harmfulness, then (i) Enter into the operation menu; (j) If it has a harmfulness, then (k) Quit and make an alarm.

31. A kind of facial unusual expression identification system program includes the following treatment procedures: .

(a) Starting ; (b) The camera devices capture the images of the animal; (c) Search after human face and/or animal images; (d) Identify human face and/or animal characters; (e) Compare between the identification results and the characters of each kind of animal stored in the biological characteristics databank; (f) Identify which person or which kind of animal it is; (g) Adjust whether or not the person and/or that animal has a harmfulness; (h) If it has no harmfulness, then (i) Enter into the operation menu; (j) If it has a harmfulness, then (k) Give a prompt to correct the person's face expression and make an alarm.

32. A kind of photographing, face identification and alarm system program having the processing principle and processing method that includes the following processing procedures:

The images signal and/or sound signal taken by the camera device (and/or digital camera devices) and/or sound-receiving module will be sent to the CPU module and then the CPU module will run a "Facial characteristics and/or biological characteristics identification program" to confirm whether or not the driver is a legal one by means of image identification system program; This system includes "Mask identification subprogram", and/or "Face tilt identification subprogram" and/or "Facial ornaments identification subprogram" and/or "Facial unusual expression identification subprogram" and/or "facemask identification

subprogram”.

Its processing procedure is: Firstly, acquire image data with mono/multi camera devices and/or mono/multi kinds of camera devices. According to the design requirements, the camera devices can be visible light, low-light and/or infrared, thermo-luminous infrared camera devices and/or numerical code camera devices, or a combination device of two or more camera devices mentioned above. Face identification and/or each kind of biological characteristic identification will be carried out to those received face images or biological characteristic images searched after in the images mentioned above. The biological characteristic identification includes iris identification, retina identification, fingerprint identification, voice recognition, identification of the shape of a mouth, and handwriting identification, special action identification. After that, the identity recognition will be done. Make a comparison between the face image characteristics and/or his/her biological image characteristics to be verified and the face image characteristics and/or his/her biological image characteristics stored in the biological characteristics databank of legal drivers to confirm whether or not the driver is a legal one. If the “Facial characteristics and/or biological characteristics identification subprogram” and/or “Facial unusual expression identification subprogram” is not able to verify whether or not the driver is a legal one, then run the “Facemask identification subprogram” and/or “Face tilt identification subprogram” and/or “Facial ornaments identification subprogram” and/or “Facial unusual expression identification subprogram” to make the identification. If the unusual expression of the person in the vehicle is found out, and/or his/her faces are not directed at the camera, then a prompt will be sent to ask that the person should immediately correct his/her facial unusual expression and should be directed at the camera. Then, retake the images and carry out face identification. If the unusual expression of the person in the vehicle is not found out, and/or his/her faces are directed at the camera, then enter into other subprogram.

When carrying out the “Facemask identification subprogram”, if it is found that the person in the vehicle wears a facemask, then enter into the alarm program. If it is not found

that the person in the vehicle wears a facemask, then enter into the “Facial ornaments identification subprogram”.

When carrying out the “Facial ornaments identification subprogram”, if it is found that the person in the vehicle wears ornaments, provide a prompt to the driver to ask him/her to
5 remove out his/her ornaments, retake his/her face image for re-carrying out face identification and remaking a comparison. If the driver is found out as a legal one, then ask the driver to wear his/her ornaments on, retake his/her face image data and store them (or the face characteristics data of the driver with the facemask taken before) in the biological characteristics databank of legal drivers as that driver’s new face characteristics data. If the
10 driver is found out as an illegal driver, make an alarm processing. In the case that the real face characteristics of a legal driver are successively obtained, carry out next program.